

the fishes dealt with in this paper into Bottom Fishes, Sluggish Shallow-water Fishes, and Free-swimming Open-water Fishes.

When tabulated thus there is seen to be practically no connection between the structure of the nose, particularly as regards the presence or absence of accessory sacs, and the general life-habit. Thus fishes of all habits may have accessory sacs (*Mullus*, Pleuronectids, *Scomber*, Herrings, Perch), or not (Eels, some Siluroids, Carps, Pike, *Scopelus*, *Gadus*, *Exocoetus*). This is a conclusion somewhat at variance with Kyle's generalization, that accessory sacs are characteristic of bottom or sluggish fishes as opposed to free-swimming forms and are in the main adaptive structures determined by habit.

On the contrary, it would appear from the above that they are rather part of a general advance in structure, and belong, at least in their most characteristic development, to families that have reached the highest all-round development.

EXPLANATION OF ABBREVIATIONS IN THE TEXT-FIGURES.

A.N., anterior nostril. ADD.M., adductor mandibulæ. AOR., antorbital scutes. AX., axis of rosette; AX.', its connection with lip of anterior nostril. B.M., buccal membrane. C., central segment of lamina. CT., curtain-like extension of bridge between nostrils. E., eye. E.MX.L., ethmo-maxillary ligament. ETH.P.A., ethmo-palatine articulation. ETH.S., ethmoidal nasal sac. FR., frontal. H., hood-like process of posterior lip of anterior nostril. L., linguiform process of lamina. LAC., lachrymal scute. L.ETH., lateral ethmoid; L.ETH.', its articular process for the lachrymal. LM., lamina. L.S., lachrymal nasal sac. MD., mandible. METH., mesethmoid. MX., maxilla. N., nasal. N.S., nasal sac. OL.B., olfactory bulb. OL.C., olfactory cavity. OL.N., olfactory nerve. P., peripheral segment of lamina. PA., palatine. PMX., premaxilla; P.MX.A., palato-maxillary articulation. P.PMX.L., palato-premaxillary ligament. P.N., posterior nares. R., rosette. R.MX., retractor maxillæ. R.PMX., retractor premaxillæ. T., tentacle.

4. Description of a new Species of the Genus *Alpheus* Fabr. from the Bay of Batavia. By J. G. DE MAN *.

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(Plate LXX. †)

ALPHEUS EHLERSII, sp. n.

Syn.: *Alpheus macrochirus* de Man, in Archiv für Naturg. 53 Jahrg. (Berlin, 1888), p. 519.

A re-examination of the two specimens of *Alpheus* from the island of Edam, Bay of Batavia, described by me (*l. c.*) under the name of *A. macrochirus* Richters, not only proved that they had been wrongly referred to that species, but also that they are the representatives of a hitherto unknown form. This new species, which I have the pleasure to dedicate to Professor Ehlers of

* Communicated by R. I. Pocock, F.L.S., F.Z.S.

† For explanation of the Plate see p. 666.

Göttingen, who kindly enabled me to study the two specimens, apparently belongs to the group "*insignis*" of Coutière and is most closely related to *A. paracrinitus* Miers, to *A. paracrinitus* Miers, var. *bengalensis* Cout., and to *A. lanceoloti* Cout., three species inhabiting the Maldives and Laccadive Archipelagoes, though the first of them was originally discovered at Goree Island, Senegambia.

The larger specimen is 16.5 mm. long, the other 15 mm.

Rostrum acute, reaching to the distal fourth of the visible part of basal antennular article; rostral carina obtuse, extending backward to the base of the rounded, unarmed, orbital hoods, from which it is separated by rather deep, though narrow grooves. On each side of the rostrum, the frontal margin (Pl. LXX. fig. 1) bears a rounded prominence, nearly as in *A. superciliaris*, but glabrous and with the outer margin more oblique. Antennal and antennular peduncles with spines and appendages nearly as in *A. paracrinitus bengalensis* (Coutière, Alpheidae Mald. and Laccad. Archip. 1905, pl. lxxxii. fig. 37). Second antennular article once and a half longer than wide distally, a little longer than the visible part of the 1st and of the 3rd, which are of equal length; stylocerite acuminate, reaching to the second fourth part of median article. Carpocerite surpassing the antennule almost by the whole length of 3rd article; the terminal spine of the scaphocerite, the outer margin of which is slightly concave, is slightly curved inward and reaches almost to midway between the extremities of both peduncles; the terminal spine exceeds by a little more than one third of its length the tip of the scale, which is a little shorter than the inner peduncle. Basicerite with a small spine on the lower side, not visible from above. Telson (Pl. LXX. fig. 2) nearly as in *A. paracrinitus* var. *bengalensis*, but the outer angles of the slightly prominent posterior margin obtuse. The length of the telson equals in both specimens 3.1 times the width of the posterior margin; the greatest width anteriorly is, in the larger specimen, 1.93 times, in the other just twice the width of posterior margin; in both specimens the spinules of the upper surface, which are 0.2 mm. long, are situated as in the var. *bengalensis* of *A. paracrinitus*, the anterior pair anterior to the middle, the proportion between the length of the telson and the distance of that pair from the posterior margin being, in the larger specimen, 1.73, in the other 1.85; the proportion between the distances of both pairs of spinules from the posterior margin is, in the larger specimen, 1.6, in the other 1.7.

Meropodite of larger chelipede twice as long as wide; upper margin unarmed at its extremity, infero-internal margin with a small acute tooth at the apex and with seven small movable spinules, 0.117 mm. long, inserted from the proximal extremity to the distal third. Chela 8.4 mm. long, one third longer than the carapace, 2.8 times longer than high, and somewhat compressed, its thickness being in proportion to the height as 2.3; upper and lower borders of the palm (Pl. LXX. fig. 3) nearly parallel, lower border

rounded, slightly concave at the base of the immobile finger, though not emarginate or notched; upper border also *rounded*, but presenting, just behind the truncate distal extremity of the palm, a *narrow groove*, running *obliquely* inward, though not continued on to the inner surface of the palm; this groove (Pl. LXX. fig. 3) runs parallel with the oblique anterior end of the elliptical area. The dactylus, a little longer than the immobile finger, measures almost one third of the palm and almost one fourth of the whole length of the chela; the palm is sparsely though distinctly punctate, the inner surface anteriorly, like that of the immobile finger, hairy, the outer surface of the latter longitudinally grooved. But for the oblique groove on the upper border, the larger chela much resembles that of *A. paracrinatus* var. *bengalensis*.

Meropodite of smaller chelipede like that of the larger, but the infero-internal margin, though also with a small acute tooth at the extremity, with only four or five movable spinules. Chela 5.55 mm. long, the larger chela once and a half as long as the other; the smaller chela (Pl. LXX. fig. 4), the fingers of which are about as long as the palm, is 3.7 times longer than high, the palm twice as long as high, with the upper border entire and rounded, like the lower.

Meropodite of 2nd legs in the larger specimen 6 times, in the other 6.85 times, longer than wide. In the larger specimen the 1st carpal segment, 5.3 times longer than thick, is just *twice as long* as the 2nd, the 2nd twice as long as the 3rd and as the 4th, which are of equal length, and the 5th a little shorter than the 2nd; the chela, the fingers of which are a little longer than the palm, is almost twice as long as the 5th segment. In the other specimen (Pl. LXX. fig. 5) the 1st carpal segment, 6.3 times longer than thick, appears *2.44 times* longer than the 2nd, and the 2nd, which is slightly shorter than the 3rd and the 4th taken together, is as long as the 5th; the chela, finally, the fingers of which are slightly longer than the palm, is 1.8 times longer than the 5th segment.

The proportions of the 5th pair (Pl. LXX. fig. 6) are: Carpus 1; meropodite 1.18; propodite 1.07. Meropodite 5.2 times, carpus 6 times, propodite 7 times longer than wide, these members with rather long setæ, and the propodite with the usual bristles; dactylus, as in *A. paracrinatus*, tapering, acuminate, 4 times as long as wide at its base, slightly curved, simple, without any trace of a secondary claw, and measuring just *two-fifths* of the propodite.

Unfortunately the legs of the 3rd and 4th pairs are absent in both specimens, except one leg of the 4th pair in the younger individual; the meropodite is quite unarmed, the propodite carries 6 spinules, and the simple dactylus agrees with that of the 5th legs.

Alpheus paracrinatus Miers differs by the upper border of the larger chela being *entire, without a groove*, by the different shape of rostrum and frontal margin, by the shorter stylocerite, and probably by other characters; *A. lanceoloti* is a more different species; and *A. macrochirus* Richters, finally, differs at first sight by the flattened, triangular rostrum, by the longitudinal groove

on the upper border of the larger chela, there being here no transverse groove, by the stouter shape of the smaller chela, by the dactyli of the 3rd and following legs being armed with two accessory claws, etc.

EXPLANATION OF PLATE LXX.

Alpheus ehlersii.

Fig. 1. Frontal and antennal region of the larger specimen, $\times 23$.

Fig. 2. Telson of the same, $\times 23$.

Fig. 3. Larger chela and carpus of the larger specimen looked at from the inner side, $\times 8\frac{1}{2}$.

Fig. 4. Smaller chelipede of the same, $\times 8\frac{1}{2}$.

Fig. 5. Second leg of the younger specimen, $\times 11$.

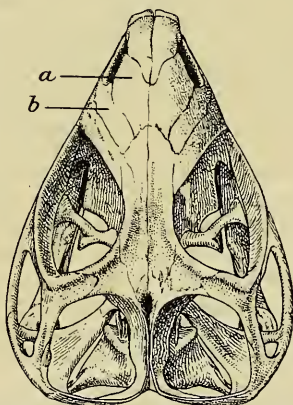
Fig. 6. Fifth leg of the larger specimen, $\times 23$.

June 15, 1909.

Dr. A. SMITH WOODWARD, F.R.S., Vice-President,
in the Chair.

Mr. H. W. Unthank, F.Z.S., exhibited a skull of *Sphenodon* with two bones on each side in the nasal region, and made the

Text-fig. 214.



Sphenodon skull with abnormal nasal region.

a. Left median bone in nasal region.

b. Left external bone in nasal region.

following remarks:—"In place of the usual single nasal on each side there appear to be two bones, one near the median line, the other more external, the line of division running from before